

RECORDS AND DESCRIPTIONS OF JAPANESE  
TIPULIDÆ (DIPTERA), PART II  
THE CRANE-FLIES OF SHIKOKU, II

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FOUR PLATES

The present report continues the recording of the Tipulidæ of Shikoku, as discussed and planned in the initial part under this title. I wish to express my deep thanks and appreciation to my Japanese colleagues, Messrs. Esaki, Harukawa, Ishihara, Issiki, Ito, Miyataki, Mutuura, Yano, and others for their efforts to make known the rich crane-fly fauna of the island. Through their friendly interest, the types of the various novelties are retained in my collection, with duplicates and named specimens being returned to the various institutions that have participated in the study.

RECORD OF DISTRIBUTION  
TIPULINÆ

61. TANYPTERA PERANGUSTA sp. nov.

Plate 1, figs. 1, 7, 8.

Size relatively small (wing, less than 12 millimeters); general coloration black, abdomen of male largely yellow; wings with a yellowish tinge, the basal and costal regions clearer yellow; stigma oval, dark brown, confluent with a large brown cloud over the anterior cord; male hypopygium with the outer dististyle pale, broad basally, gradually narrowed to an acute terminal spine; inner dististyle darkened, virtually parallel-sided, the lower apical angle produced into a short point.

*Male*.—Length, about 12.5 to 13 millimeters; wing, 10 to 10.5.

*Female*.—Length, about 14 millimeters; wing, 11.

Rostrum black; palpi obscure yellow, the terminal segment chiefly blackened. Antennæ (male) with scape brown, pedicel and axis of the flagellum yellow, the branches and axes of outer segments dark brown; branch of first flagellar segment stout, uniformly yellow, of the second segment exceeding one-third the length of the basal branch; succeeding segments with the outer branch dusky apically. Head polished black.

Pronotum brownish yellow, blackened on sides. Mesonotum black, the dorsopleural membrane whitened. Pleura black. Halteres pale yellow. Legs with all coxæ black; trochanters yellow, femora yellow, the tips narrowly and abruptly black, with about the outer sixth or seventh included; tibiæ brownish yellow, the tips more narrowly blackened, the base less evidently infuscated; tarsi black, the proximal end of basitarsus obscure yellow. Wings (Plate 1, fig. 1) with a yellow tinge, the basal and costal regions clearer yellow; stigma oval, dark brown, confluent with a large paler brown cloud over the anterior cord; veins dark brown, yellow in the flavous portions. Venation:  $R_{1+2}$  variable, from entirely preserved to entirely atrophied, in the former case suberect and in approximate alignment with  $R_2$ ; petiole of cell  $M_1$  from one-half to three-fourths the cell.

Abdomen (male) yellow, the first tergite and a broad central stripe on the succeeding tergites blackened, narrowly interrupted on posterior part of the segments, leaving broad lateral borders that are narrowest in front; hypopygium and preceding segment black. In the female, abdomen black, the subterminal tergite very narrowly bordered posteriorly by yellow. Cerci large, sabre-shaped, chestnut-brown. Male hypopygium (Plate 1, fig. 8) with the outer dististyle pale, broadest at base, gradually narrowed to the acute blackened point; surface with abundant pale setæ, those of outer surface unusually abundant, long and erect. Inner dististyle,  $d$ , dark colored, blackened along lower margin, nearly as long as outer style, beyond the slightly dilated base being virtually parallel-sided, the apex subtruncated, the lower apical angle produced into a short point.

In *angustistyla* (Plate 1, fig. 7) the outer dististyle,  $d$ , is widened basally but only slightly narrowed outwardly, at apex bent mesad into an acute blackened point; inner dististyle slender, gradually narrowed outwardly.

*Habitat*.—Japan (Shikoku).

Holotype, male, Iwai, near Imanoyama, Tosa, altitude 200 meters, May 11, 1951 (*Issiki-Ito*). Allotopotype, female, pinned with type. Paratopotypes, 2 males.

The only similar small sized regional member of the genus is *Tanyptera angustistyla* Alexander, which differs especially in the details of structure of the male hypopygium, as described and figured.

## 62. DOLICHOPEZA (NESOPEZA) CIRCULANS sp. nov.

Plate 1, figs. 2, 4.

General coloration medium brown to cinnamon brown; legs brown, the outer tarsal segments paling to yellow; wings strongly infuscated, the small oval stigma slightly darker brown, relatively inconspicuous; no pale post-stigmal area;  $R_s$  short, arcuated; cell  $M_1$  nearly twice its petiole; male hypopygium with the posterior border of the tergite heavily blackened, trilobed, the lobes without spicules; eighth sternite narrowed outwardly, the posterior border produced ventrad into two setiferous lobes that are separated by a broad rounded notch.

*Male*.—Length, about 10 millimeters; wing, 11.

Frontal prolongation of head short, brown, without a nasus but with long conspicuous setæ, the longest only a little shorter than the prolongation itself; palpi brown, the terminal one exceeding the others combined. Antennæ with the scape and pedicel pale brown, the latter yellowed apically; flagellum broken. Head brown, the low vertical tubercle slightly compressed, obscure brownish yellow.

Thorax almost uniformly medium brown to cinnamon brown, the surface opaque; præscutum with indications of four very slightly darker stripes; centers of scutal lobes and the scutellum somewhat darker than the ground. Halteres brown. Legs with the coxæ brown; trochanters obscure yellow; remainder of legs brown, the outer tarsal segments paling to yellow. Wings (Plate 1, fig. 2) strongly infuscated, the relatively small oval stigma slightly darker brown, inconspicuous; no pale post-stigmal area; veins brown. Venation:  $R_s$  short, arcuated, subequal to m-cu; cell  $M_1$  nearly twice its petiole; m-cu about one-third its length before fork of  $M$ ; cell  $M_4$  moderately deep, the distal section of vein  $Cu_1$  about twice m-cu; cell 2nd A relatively broad.

Abdominal tergites dark cinnamon brown, the borders narrowly darker brown; basal sternites brownish yellow, the posterior margins narrowly darker; outer segments, including the hypopygium, dark brown. Male hypopygium (Plate 1, fig. 4) with the posterior border of the ninth tergite,  $9t$ , heavily blackened, without spicules, trilobed, the median lobe lower. Outer dististyle,  $d$ , dusky, from four to four and one-half times as long as broad. Gonapophysis,  $g$ , appearing as a flattened blade, narrowed on outer third, the lower apical angle produced into a small point. Eighth sternite,  $8s$ , narrowed outwardly, the posterior border produced ventrad into two

lobes that are separated by a broad rounded notch, the lobes provided with coarse setæ.

*Habitat*.—Japan (Shikoku).

Holotype, male, Omogokei, Iyo, July 22, 1949 (*Miyatake*).

The most similar regional species is *Dolichozepe* (*Nesopeza*) *tarsalis* Alexander, which differs in the coloration of the body and wings, details of venation, and particularly the structure of the male hypopygium, especially the tergite, gonapophysis and eighth sternite.

63. **DOLICHOPEZA (NESOPEZA) IDIOPHALLUS** (Alexander).

*Nesopeza idiophallus* ALEXANDER, Philip. Jour. Sci. 40 (1929) 324–325, pl. 2, fig. 27 (♂ hypopygium, ædeagus).

TOSA: Imanoyama, altitude 800 meters, May 12, 1951 (*Issiki-Ito*). Described from Chekiang, eastern China, but later found in Japan.

64. **DOLICHOPEZA (OROPEZA) CANDIDIPE** (Alexander).

*Oropeza candidipes* ALEXANDER, Ent. Soc. America Ann. 14 (1921) 122.

*Oropeza candidipes* ESAKI, et al., Icon. Insect. Japan Ed. 2 (1950) 529, fig.

AWA: Mount Tsurugi, Kawati, altitude 400 meters, May 29, 1950 (*Issiki-Ito*); Minokosi, altitude 1,400 meters, to Nagoro, altitude 900 meters, June 1, 1950 (*Issiki-Ito*); Sugeoi, June 4, 1950 (*Issiki-Ito*).

65. **DOLICHOPEZA (OROPEZA) INOMATAI** Alexander.

*Dolichozepe* (*Oropeza*) *inomatai* ALEXANDER, Philip. Jour. Sci. 51 (1933) 370–371, pl. 1, fig. 1 (venation), pl. 2, fig. 25 (♂ hypopygium).

TOSA: Mount Imanoyama to Iwai, altitude 200 meters, May 11, 1951 (*Issiki-Ito*); Mount Imanoyama, altitude 800 meters, May 12, 1951 (*Issiki-Ito*).

66. **DOLICHOPEZA (OROPEZA) SAITAMENSIS** Alexander.

*Dolichozepe* (*Oropeza*) *saitamensis* ALEXANDER, Philip. Jour. Sci. 43 (1930) 510–511, pl. 2, figs. 29, 30 (♂ hypopygium).

AWA: Mount Tsurugi, Kawati to Minokosi, altitude 1,400 meters, May 30, 1950 (*Issiki-Ito*); Nagoro to Sugeoi, June 3, 1950 (*Issiki-Ito*).

The male hypopygium of this material and some other specimens from Honshu do not show the apices of the lateral tergal arms as distinctly roughened as in the holotype. Mention should be made of the abundant setulæ on the mesal face of

the basistyle, providing an extensive area with a cushion-like appearance.

67. *NEPHROTOMA CORNICINA* (Linnaeus).

*Tipula cornicina* LINNÆUS, Syst. Nat. Ed. 10 (1758) 586.

*Pachyrhina cornicina* RIEDEL, Deutsch. Ent. Zeitschr. (1910) 432.

*Pachyrhina cornicina* CZIZEK, Zeitschr. Mahresch. Landesmus. 11 (1911) 74-78, fig. 11 (♂ hypopygium).

*Pachyrhina cornicina* BROLEMANN, Soc. Hist. Nat. Toulouse Bull. 51 (1923) 507-509, pl. 10, figs. 1-8 (♂ hypopygium).

*Nephrotoma cornicina* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1532, fig.

*Pales cornicina* MANNHEIMS, in Lindner, Die Fliegen Palaearkt. Reg. 167 (1951) 42.

IYO: Matsuyama, May 23, 1948 (*Miyatake*).

TOSA; Nahari, May 1, 1951 (*Issiki-Ito*).

Widely distributed over the Palearctic Region, including eastern China and Kashmir.

68. *NEPHROTOMA DAISENSIS* Alexander.

Plate 1, fig. 5.

Hitherto known only from the unique type female, taken on Mount Daisen, Hoki, Honshu.

Allotype, male, length, about 14 millimeters; wing, 14.5; antenna, about 3.1.

Characters virtually as in the holotype female except for the sexual characters. Frontal prolongation of head only narrowly blackened medially above, this including the nasus; palpi pale yellow throughout. Antennæ relatively short, as shown by the measurements, the flagellar segments less than the verticils; segments not or scarcely incised, merely a little enlarged basally.

Male hypopygium (Plate 1, fig. 5) with the ninth tergite, *9t*, produced caudally into two flattened lobes, their apices truncate, the upper surface with spicules that are directed outward, the more extensive ventral flanges with backwardly-directed points; on outer margin at base of each blade with a slender curved arm. Basistyle with an irregular brown thickening on mesal face. Outer dististyle, *d*, moderately long, the outer third strongly narrowed, the upper margin of basal half dilated. Inner dististyle, *d*, with the beak narrow; dorsal crest unusually high and conspicuous, pale, the margin divided into six acute points. Gonapophysis, *g*, appearing as a small oval blade, the stem short and stout. Eighth sternite, *8s*, transverse, widened outwardly, the caudal

margin truncated; median area of posterior border pale, provided with dense area of delicate yellow setulæ.

Allotype, male, Mount Tsurugi Sugeoi, Awa, June 4, 1950 (*Issiki-Ito*).

The somewhat remarkable male hypopygium readily distinguishes this fly from all other known species. In the high serrate dorsal crest of the inner dististyle it most resembles *Nephrotoma serristyla* Alexander, of China and eastern Siberia, an otherwise entirely distinct fly.

69. *NEPHROTOMA ELECTRIPENNIS* sp. nov.

Plate 1, fig. 3.

Mesonotal præscutum polished yellow, with three polished brown stripes; an opaque blackened area opposite anterior end of the straight lateral stripes and a similar marking at each end of the suture; occipital brand very reduced; pronotum and postnotum yellow, the mediotergite with abundant delicate pale setæ; legs yellow, the outer tarsal segments more infuscated; wings tinged with pale yellow, unpatterned; veins black, conspicuous, those of the costal border paler; cell  $M_1$  broadly sessile; abdomen yellow, the tergites with a broad brown central stripe and narrow lateral ones, all interrupted at the posterior borders of the segments.

*Female*.—Length, about 14 millimeters; wing, 14.

Frontal prolongation of head yellow; nasus distinct; basal segment of palpus yellow, the intermediate two more darkened, especially apically; terminal segment black. Antennæ with scape and pedicel light yellow; flagellum broken. Head above, including the high simple vertical tubercle, orange, the genæ and beneath more whitened; vague indications of a darker capillary median line and orbital spots; occipital brand very small and inconspicuous, pale gray.

Pronotum light yellow. Mesonotal præscutum polished yellow with three polished brown stripes, the lateral pair straight but with a very conspicuous opaque black area opposite its anterior end; scutum yellow medially, each lobe with a major brown area; lateral ends of suture velvety black, the mark bent caudad around the sides of the scutal lobe; scutellum testaceous yellow; mediotergite light yellow, vaguely patterned with darker behind, the surface with abundant microscopic pale setæ, inconspicuous because of their color; pleurotergite whitened, especially the katapleurotergite. Pleura whitened, variegated with more reddish areas on the ventral sternopleurite

and ventral anepisternum. Halteres pale, the apex of knob weakly darkened. Legs with the coxæ yellow, the fore pair a little darker; trochanters obscure yellow; femora and tibiæ yellow, the outer tarsal segments more infuscated. Wings (Plate 1, fig. 3) almost uniformly tinged with pale yellow, cell C a trifle more intense; stigma not differentiated from the ground, with about a dozen trichia; veins black, conspicuous, those of the prearcular and costal fields more yellowed. Venation:  $Sc_2$  ending about opposite one-third to one-fourth  $Rs$ , the latter oblique, about one-third longer than the basal Section of  $R_{4+5}$ ; free tip of  $Sc_2$  virtually obliterated; cell  $M_1$  broadly sessile; m-cu at point of forking of vein  $M_4$ .

Abdominal tergites yellow, with a broad dark brown central stripe extending from segment two to six, inclusive, broadly interrupted at the posterior borders; lateral tergal stripes much narrower; sternites yellow, with indications of a narrow broken median stripe from sternite two to the base of five; valves of ovipositor horn-yellow, the bases of the hypovalvæ brownish black.

*Habitat*.—Japan (Shikoku).

Holotype, female, Mount Tsurugi, Nagoro, Awa, altitude 900 meters, June 2, 1950 (*Issiki-Ito*).

The most similar regional species include *Nephrotoma atro-latera* Alexander, of Formosa, and *N. minuticornis* Alexander, of Japan, both differing evidently in the body coloration and in the details of venation. There seems to be no possible doubt as to the distinctness of the present fly, despite the present lack of the male sex.

70. *NEPHROTOMA ESAKII* Alexander.

Plate 2, fig. 11.

*Nephrotoma esakii* ALEXANDER, Philip. Jour. Sci. 24 (1924) 596-597; 58 (1935) 226, pl. 1, fig. 7 (venation) pl. 3, fig. 36 (♂ hypopygium).

IYO: Mount Saragamine, altitude 1,271 meters, July 18, 1947 (*Miyatake*).

The somewhat noteworthy ovipositor is shown (Plate 2, fig. 11). Both the cerci and hypovalvæ appear as compressed yellow blades, with setæ virtually to their tips; cerci with apices obtuse, those of hypovalvæ acute.

This condition of the ovipositor is quite different from that found in most Holarctic species of the genus, where the cerci are elongate, sclerotized, and either blunt or acutely pointed

at tips. The condition in the western Palæarctic species is given by Mannheims.<sup>1</sup>

71. *NEPHROTOMA FLAVONOTA* (Alexander).

Plate 1, fig. 6.

*Pachyrhina flavonota* ALEXANDER, Can. Ent. 46 (1914) 158-159, pl. 11, fig. 5 (wing), pl. 11, figs. 6, 15 (♂ hypopygium).

TOSA: Mount Imanoyama to Iwai, altitude 200 meters, May 13, 1951 (*Issiki-Ito*).

The figures accompanying the original description of this fly are insufficient and are supplemented herewith. Male hypopygium (Plate 1, fig. 6) with the ninth tergite, *9t*, transverse, the caudal margin with two broad lobes on either side of a narrow median emargination, all lobes with abundant black spicules. Basistyle, *b*, on mesal face with a bilobed or bilabiate dark sclerotized structure immediately above the darkened margin of the median incision of the ninth sternite, *9s*, the surface of the lobe microscopically roughened. Outer dististyle, *d*, unusually long and slender, tapering outwardly, often curved. Inner dististyle, *d*, pale, the beak long and slender, the lower beak reduced to a small conical tooth or point; postero-dorsal crest long and conspicuous when extended, in cases bent backward across the style and thus rendered inconspicuous, in cases the crest even larger than shown and more expanded outwardly; disk of style with unusually abundant retrorse setæ. Gonapophysis, *g*, appearing as a small flattened oval blade. Eighth sternite *8s*, large, sheathing, very slightly narrowed outwardly, terminating in two broad lobes that are separated by a V-shaped emargination filled with pale membrane, the lobes bearing abundant long yellow setæ.

The species is not only widely distributed in Japan but also occurs in eastern China.

72. *NEPHROTOMA PULLATA* (Alexander).

Plate 2, fig. 9.

*Pachyrhina pullata* ALEXANDER, Can. Ent. 46 (1914) 160-162, pl. 11, figs. 1 (wing), 12 (♂ antenna), 7, 14 (♂ hypopygium).

*Nephrotoma hokkaidensis* ALEXANDER, Ent. Soc. America Ann. 17 (1924) 446-447.

IYO: Matsuyama, April 19, May 13, 1949 (Yano); April 23, 1950 (*Miyatake*).

Male hypopygium (Plate 2, fig. 9) with the ninth tergite, *9t*, black, transverse, the caudal border produced into two spiculate lobes that are separated by a linear notch; each lobe with a

<sup>1</sup> Mannheims, B. In Lindner, Die Fliegen Palæarkt. Reg., Lief 167 (1951) 33, figs. A, B.



higher more ventral point to appear more or less bilobed. Outer dististyle, *d*, short and broad, the apical point short. Inner dististyle, *d*, long and narrow, without developed crests, the beak relatively slender. Gonapophysis, *g*, appearing as a long blade, the tip acute, subequal in length to the ædeagus. Eighth sternite, *8s*, broad, widened outwardly, the posterior margin entire; surface of sternite with very abundant short black setæ that are directed caudad.

*Nephrotoma subpratensis* Alexander, while being somewhat similar to the present fly in general coloration of the body and appendages, is a distinct species.

73. *NEPHROTOMA SINENSIS* (Edwards).

*Pachyrrhina sinensis* EDWARDS, Ann. and Mag. Nat. Hist. (8) 18 (1916) 268-269.

*Nephrotoma sinensis* ALEXANDER, Philip. Jour. Sci. 57 (1935) 145.

*Nephrotoma sinensis* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1532, fig.

IYO: Mount Ishizuchi, altitude 1,000 meters, August 10, 1925 (*Harukawa*).

74. *NEPHROTOMA VIRGATA* (Coquillett).

Plate 2, fig. 10.

*Pachyrrhina virgata* COQUILLET, U. S. Nat. Mus. Proc. 21 (1898) 306.

*Pachyrrhina virgata* ALEXANDER, Can. Ent. 46 (1914) 163-164, pl. 11, figs. 4 (wing), 10 (♂ antenna), 9, 13 (♂ hypopygium).

*Nephrotoma virgata* MASAKI, Tottori Soc. Agr. Science Trans. 4 (1933) 368-386, 2 pls. (all stages); in Japanese.

*Limnophila japonica* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1532, fig.

*Pachyrrhina serricornis* BRUNETTI, Fauna Brit. India, Dipt. Nematocera (1912) 343; (erroneous determination).

IYO: Iwazeki, April 29, 1949 (*Yano*).

Male hypopygium (Plate 2, fig. 10) with the ninth tergite, *9t*, transverse, the posterior border produced into two lobes that are separated by a transversely oval notch; margins of lobes densely spiculate, their mesal ends produced inward, partially closing the notch; outer portion of lobe farther produced into a stout blade that narrows to an acute spine, the produced margin and base with a small number of spicules; dorsal surface of tergite on either side with relatively sparse long pale setæ. Ninth sternite on ventral part with a dark-colored microscopically spiculate structure that is directed ventrad. Outer dististyle, *d*, only moderately elongate, the apical point short. Inner dististyle, *d*, with the beak slender, lower beak short but conspicuous, directed outwardly; posterior

crest produced behind, glabrous; disk of style with pale, moderately abundant retrorse setæ; face of style from the beak backward with an elongated lacuna, widened behind. Phallosome with the gonapophysis, *g*, very small and weak diaphanous, much smaller than the darkened ædeagus, *a*. Eight sternite, 8s, transverse, both the caudal and cephalic margins shallowly emarginate; posterior half with abundant weak setæ that become more numerous internally and are directed toward the median notch; posterior border, or the membrane immediately behind it, with a sclerotized ligula that is densely microscopically roughened, the structure directed cephalad toward the eighth sternite.

The very important paper by Masaki, cited above, considers the life history in detail and describes and figures all stages of this insect. This is evidently the species recorded by Brunetti from Yokohama as being *Nephrotoma serricornis* (Brunetti), a common and well known Indian species. While similar in general appearance, the two species are quite distinct and any record of *serricornis* from Japan at the present time should be deleted.

75. *TIPULA* (*SCHUMMELIA*) *NIPPONENSIS* Alexander.

*Tipula nipponensis* ALEXANDER, Can. Ent. 46 (1914) 236-237, pl. 16, fig. 2 (wing), pl. 19, fig. 2 (♂ hypopygium).

*Tipula nipponensis* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1534, fig.

IYO: Dogo, near Matsuyama, March 31, 1946 (*Yano*); Omo-gokei, September 7, 1951 (*Miyatake*), a broken male, apparently of this species.

76. *TIPULA* (*YAMATOTIPULA*) *NOVA* Walker

*Tipula nova* WALKER, List Dipt. Brit. Mus. 1 (1848) 71.

*Tipula fumifasciata* BRUNETTI, Indian Mus. Rec. 6 (1911) 250; Fauna Brit. India, Dipt. Nematocera (1912) 308, pl. 5, fig. 7 (wing).

*Yamatotipula nohiræ* MATSUMURA, Thous. Ins. Japan, Addit. 2 (1916) 461-462, pl. 25, fig. 4 (whole ♀).

*Tipula* (*Yamatotipula*) *nova* ALEXANDER, Philip. Jour. Sci. 57 (1935) 108.

*Tipula nova* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1536, fig.

IYO: Dogo, near Matsuyama, June 9, 1948, November 12, 1947 (*Yano*); Idai, near Matsuyama, May 12, 1949 (*Miyatake*); October 11 to 17, 1948 (*Ishihara-Miyatake*).

Matsuyama, at light trap, July 15, 1948, September 12, 1948,

## 77. TIPULA (ACUTIPULA) BULBIFERA sp. nov.

Plate 2, fig. 15

General coloration of mesonotal præscutum light gray, the usual præscutal strips not or scarcely differentiated; antennæ (male) relatively long, the proximal flagellar segments weakly bicolored; posterior sclerites of notum and the pleura yellow; wings strongly tinged with brownish, stigma brown; a conspicuous whitened obliterative area before the anterior cord; basal abdominal segments yellow, the tergites with a conspicuous brown sublateral stripe, the margins broadly pale; outer three segments blackened; male hypopygium with the tergite produced into a simple spiculose lobe; outer dististyle relatively small, pale, with sparse short setæ; inner dististyle with the apex of the outer lobe obtuse, with a strong erect spine on inner margin below the apex.

*Male*.—Length, about 18 millimeters; wing, 21.5; antenna, about 6.2.

Anterior region of head broken. Antennæ (male) relatively long; scape and pedicel yellow, succeeding segments weakly bicolored, the basal enlargements black, the stems brown, the color of the latter becoming darker on the outer segments; segments subequal to or a trifle longer than the longest verticil. Head above dark brownish gray.

Pronotum buffy yellow. Mesonotal præscutum almost uniformly light gray, the usual stripes not or scarcely differentiated from the ground; scutal lobes similarly dark gray; scutellum destroyed in pinning; postnotum light yellow, including the pleurotergite. Pleura yellow, unpatterned. Halteres with stem brown, the knob a little darker. Legs with the coxæ grayish yellow; trochanters yellow; femora and tibiæ obscure yellow, the narrow tips dark brown; tarsi brown; passing into black; claws (male) toothed. Wings strongly tinged with brownish, the prearcular and costal regions more yellowed; stigma elongate, brown; a major whitened area before the stigma and anterior cord, extending into the base of cell  $M_3$ ; veins dark brown, brownish yellow in the brightened fields, white in the obliterative area. Venation: Rs about one-third to one-fourth longer than m-cu; petiole of cell  $M_1$  about one-half longer than m.

Basal abdominal tergites obscure yellow, with a conspicuous brown sublateral stripe, the lateral margins broadly pale; basal sternites yellow; seventh and succeeding segments blackened. Male hypopygium (Plate 2, fig. 15) with the caudal margin extended into a simple spiculose point, not bifid as in *gemma*.

Outer dististyle, *d*, much smaller than in *gemma*, appearing as a pale blade, with relatively short and scattered setæ. Inner dististyle, *d*, broken but the portion distad of the beak preserved and showing distinctive characters; apex of outer lobe expanded, subcircular or bulbous; outer portion of disk before apex with a low compressed flange; inner margin between the outer lobe and the beak produced into a strong erect spine; sensory area including rather numerous pores, at least a score in number; outer surface of style with long erect retrorse setæ. Eighth sternite scarcely sheathing, the posterior border on either side of the midline produced into a low lobe that is provided with abundant yellow setæ. This latter somewhat suggests the condition in the otherwise quite distinct *bicompressa* and *bipenicillata*.

*Habitat*.—Japan (Shikoku).

Holotype, male, Iwai, near Imanoyama, Tosa, altitude 200 meters, May 11, 1951 (*Issiki-Ito*).

In its general appearance, particularly in the pattern of the wings, the present fly much resembles *Tipula* (*Acutipula*) *gemma* sp. nov., which has the details of coloration and especially of the structure of the male hypopygium quite distinct, particularly the tergite, both dististyles, and the eighth sternite.

78. *TIPULA* (*ACUTIPULA*) *GEMMA* sp. nov.

Plate 2, fig. 14.

General coloration gray, the præscutum with four brown stripes, the intermediate pair confluent behind; wings strongly infuscated; stigma dark brown; a major whitened area before the anterior cord; abdomen with the basal segments fulvous, the outer ones, with the hypopygium, black; male hypopygium with the ninth tergite produced into two broad spiculate lobes that are separated by a narrow notch; outer dististyle truncated at apex; inner dististyle with its outer lobe relatively slender, the apex split into two microscopic points; beak of style compressed, subtruncate and blackened apically.

*Male*.—Length, about 20 millimeters; wing, 22; antenna, about 4.5.

Frontal prolongation of head long, nearly equal to the remainder of head, dark gray above, brown on ventral half; nasus long; palpi brownish black. Antennæ with the scape and pedicel dark brown, basal two or three flagellar segments brown, the outer ones darker brown to brownish black; flagellar segments with basal swellings moderately developed, longest

verticils a trifle shorter than the segments. Head uniformly gray; vertex flattened, without a tubercle.

Pronotum gray, variegated with brown. Mesonotum gray, the præscutum with four brown stripes, the intermediate pair long, narrowed on anterior fourth, becoming confluent behind, their inner borders narrowly more darkened; scutal lobes less evidently darkened; posterior sclerites of notum light gray, with a vague central darkened line; katapleurotergite well-delimited, more yellowish gray. Pleura clear light gray; dorso-pleural membrane buffy in front surrounding the spiracle, more infuscated elsewhere. Halteres pale brown, the knobs dark brown. Legs with the coxæ light gray; trochanters yellow; femora brownish yellow, becoming darker outwardly, the tips, involving about the distal eighth or less, dark brown to brownish black; tibiæ and tarsi brownish black; claws strongly toothed. Wings with the ground strongly infuscated, the prearcular and costal fields more brownish yellow; stigma dark brown, conspicuous; a major whitish area before the stigma and anterior cord, occupying the proximal half of cell 1st  $M_2$  and barely invading cell  $M_3$ ; no poststigmatal brightening; veins black, brown in the costal and prearcular fields, still paler in the obliterative area. Venation: Rs only a little longer than m-cu; m and the petiole of cell  $M_1$  subequal.

Abdomen with the basal four segments fulvous, the posterior borders of the tergites narrowly yellow, the lateral margins more evidently so; basal rings of the third and fourth tergites very narrowly darkened; on the fourth segment a sublateral darkening, the succeeding segments more uniformly blackened, including the hypopygium. Male hypopygium (Plate 2, fig. 14) with the shoulders of the ninth tergite, *9t*, rounded, the median area produced into two broad lobes that are separated by a narrow notch, the lobes with abundant spicules. Both the eighth and ninth sternites unarmed, the latter sloping obliquely. Outer dististyle, *d*, flattened, arcuate, widened outwardly, the apex truncate; lower angle square to slightly acute. Inner dististyle, *d*, with the outer lobe relatively slender, narrowed outwardly, the apex microscopically split into two points, with a further longer spine on the lower margin back from the tip; outer surface or crest of lobe with long conspicuous setæ; beak conspicuous, compressed, subtruncate and blackened apically. Gonapophysis, *g*, appearing as a relatively short and stout dusky blade.

*Habitat*.—Japan (Shikoku).

Holotype, male, Mount Saragamine, Iyo, altitude 1,271 meters, June 2, 1951 (*Miyatake*).

The present fly is quite distinct from the other members of the subgenus in Japan, being most similar to forms such as *Tipula* (*Acutipula*) *kuzuensis* Alexander and *T. (A.) tokionis* Alexander. It differs evidently in body and wing coloration and in the structure of the male hypopygium, particularly the ninth tergite and the inner dististyle.

79. *TIPULA* (*ARCTOTIPULA*) *HIRTICULA* sp. nov.

Plate 2, figs. 12, 13.

General coloration of mesonotum light gray, the præscutum with four entire dark brown stripes, the intermediate pair not reaching the anterior margin; no nasus; antennal pedicel light yellow, flagellum black; femora brownish yellow, the tips broadly blackened, tibiæ and tarsi black; wings brownish yellow, stigma oval, dark brown, conspicuous, remainder of wing weakly patterned with brown; basal abdominal segment gray, succeeding tergites brownish black, pruinose, with broad reddish yellow margins; outer segments, including the hypopygium, more uniformly blackened; male hypopygium with the ninth tergite narrowly transverse, very hairy, the median region beneath produced into a depressed sclerotized plate; inner dististyle with the posterior end of the head produced backward into an acute point.

*Male*.—Length, about 15 to 16 millimeters; wing, 18 to 18.5; antenna, about 4.

Frontal prolongation of head elongate, subequal in length to the remainder of head, dark gray; nasus lacking; palpi black. Antennæ of moderate length; scape brown, pedicel light yellow, flagellum black flagellar segments moderately incised, the basal enlargements conspicuous; longest verticils subequal to or slightly longer than the segments. Head dark gray with a capillary darker brown median line; vertical tubercle very low and inconspicuous.

Pronotum gray, with a small dark brown central spot. Mesonotal præscutum light gray, best indicated at the borders, with four entire dark brown stripes; intermediate pair narrowly separated by a brown vitta, connected behind, the stripes ending some distance before the cephalic margin; posterior interspaces weakly infuscated; posterior sclerites of notum gray, each scutal lobe with two confluent dark brown areas; scutellum with a barely indicated capillary brown median line; mesonotum unusually glabrous. Pleura and pleurotergite clear

light gray; dorsopleural membrane yellow. Halteres with stem yellow, knob infuscated. Legs with all coxæ clear light gray, with long pale setæ; trochanters yellow; femora brownish yellow, the tips broadly blackened; tibiæ and tarsi black; claws (male) small, simple. Wings (Plate 2, fig. 12) relatively narrow, brownish yellow, the prearcular field and costal cell more saturated yellow, cell Sc brown; stigma oval, dark brown, conspicuous; a weak brown pattern, including seams over the cord and adjacent veins, together with the broad wing tip; paler prestigmal and poststigmal areas, best indicated by the more yellowed veins; remaining veins brownish black. Macrotrichia on  $R_{4+5}$  and more sparsely on outer end of  $R_3$ , lacking elsewhere on veins beyond cord; no stigmal trichia. Venation:  $R_s$  about twice  $m-cu$ ;  $R_{1+2}$  in virtual longitudinal alignment with  $R_2$ ;  $m$  subequal to or longer than the petiole of cell  $M_1$ , varying in the degree of obliquity.

Basal abdominal segment gray; succeeding tergites brownish black, pruinose, with the margins broadly obscure reddish yellow; basal sternites extensively reddish yellow, vaguely patterned with darker; outer segments, including hypopygium, blackened, pruinose, the outer dististyle pale. Male hypopygium (Plate 2, fig. 13) with the tergite,  $9t$ , narrowly transverse, the width across the body being about five times the length; surface with abundant long black setæ; median region of posterior border produced ventrad into a depressed sclerotized, plate, the apical margin of which is toothed as figured. Basistyle,  $b$ , with a sclerotized plate, the cephalic part of which is microscopically spiculose or roughened. Outer dististyle,  $d$ , oval, about twice as long as broad, pale, with scattered retrorse setæ. Inner dististyle,  $d$ , about as long, narrower, appearing as a simple sinuous blade, its beak obtuse; posterior end of head produced backward into a small acute point, surrounded by a few long setæ; before the beak, in the position usually occupied by the lower beak with a small conical blackened point. Phallosome reduced.

*Habitat*.—Japan (Shikoku).

Holotype, male, Ojoin, near Niihama, Iyo, April 14, 1949 (*Miyatake*). Paratopotype, a teneral male.

The nearest relatives of this fly include various northern and subarctic species in the Holarctic fauna, including *Tipula* (*Arctotipula*) *besselsi* Osten Sacken, *T. (A.) salicetorum* Siebke, *T. (A.) kincaidi* Alexander, and others. There are no close allies in Japan. The structure and armature of the

ninth tergite of the male hypopygium is quite different from that of the various species above mentioned.

80. *TIPULA (VESTIPLEX) SERRICAUDA* Alexander.

*Tipula serricauda* ALEXANDER, Can. Ent. 46 (1914) 237-238, pl. 10, fig. 4 (wing), pl. 19, fig. 6 (ovipositor).

*Tipula asio* ALEXANDER, N. Y. Ent. Soc. Jour. 26 (1918) 68.

*Tipula (Vestiplex) asio* ALEXANDER, Philip. Jour. Sci. 57 (1935) 118.

*Tipula (Vestiplex) serricauda* ALEXANDER, Philip. Jour. Sci. 57 (1935) 118.

AWA: Mount Tsurugi, Kawati to Minokosi, altitude 1,400 meters, May 30, 1950 (*Issiki-Ito*).

IYO: Mount Iwaya, altitude 600 meters, May 22, 1949 (*Miyatake*).

## LIMONIINÆ

### LIMONIINI

81. *LIMONIA (LIMONIA) ANTHRACINA* (Alexander).

*Limnobia anthracina* ALEXANDER, Insec. Inscit. Menst. 10 (1922) 180-181.

TOSA: Nisigawa to Kokusen, altitude 600 meters, May 4, 1951, altitude 1,000 meters, May 3, 1951 (*Issiki-Ito*); Kokusen, near Yanase, altitude 500 meters, May 5, 1951 (*Issiki-Ito*).

82. *LIMONIA (LIMONIA) EUPHILETA* Alexander.

*Limonia euphileta* ALEXANDER, Insec. Inscit. Menst. 12 (1924) 154.

*Limonia biceps* ALEXANDER, Ann. and Mag. Nat. Hist. (9) 15 (1925) 386-388, figs. 2, 3 (venation, ♂ hypopygium).

*Limonia (Limonia) euphileta* ALEXANDER, Philip. Jour. Sci. 51 (1933) 530-531.

AWA: Mount Tsurugi, Kawati to Minokosi, altitude 1,400 meters, May 30, 1950, Mount Tsurugi, altitude 1,400 to 1,955 meters, May 31, 1950 (*Issiki-Ito*); Minokosi, altitude 1,400 meters, to Nagoro, altitude 900 meters, June 1, 1950 (*Issiki-Ito*).

TOSA: Totidani, near Yanase, altitude 400 meters, May 2, 1951 (*Issiki-Ito*); Nisigawa to Kokusen, altitude 600 meters, May 4, 1951 (*Issiki-Ito*).

83. *LIMONIA (LIMONIA) FUSCICEPS* Alexander.

*Limonia fusciceps* ALEXANDER, Insec. Inscit. Menst. 12 (1924) 155-156.

*Limonia (Limonia) fusciceps* ALEXANDER, Philip. Jour. Sci. 51 (1933) 531, pl. 3, fig. 34 (♂ hypopygium).

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1950 (*Issiki-Ito*).



## 84. LIMONIA (LIMONIA) MACHIDAI (Alexander).

*Diceranomyia machidai* ALEXANDER, Ent. Soc. America Ann. 14 (1921) 113.

*Limonia (Limonia) machidai* ALEXANDER, Philip. Jour. Sci. 42 (1930) 507.

*Limnobia pusilla* LACKSCHEWITZ, Naturhist. Mus. Wien Ann. (1928) 232-233, pl. 6, figs. 21, a, b (♂ hypopygium).

TOSA: Nisigawa to Kokusen, near Yanase, altitude 600 meters, May 4, 1951 (*Issiki-Ito*); Kokusen, altitude 500 meters, May 5, 1951 (*Issiki-Ito*).

A very widespread species throughout the eastern Palæarctic Region, occurring as far to the west as Austria.

## 85. LIMONIA (LIMONIA) NUBECULOSA Meigen.

*Limonia nubeculosa* MEIGEN, Klass. 1 (1804) 60.

*Limonia (Limonia) nubeculosa* EDWARDS, Soc. British Ent. Trans. 5 (1938) 25, pl. 2, figs. 6, 7 (wing).

*Limnobia sciophila* OSTEN SACKEN, U. S. Geol. Surv. Bull. 3 (1877) 197.

*Limnobia subnubeculosa* ALEXANDER, Amer. Ent. Soc. Trans. 46 (1920) 5-6.

*Limonia (Limonia) subnubeculosa* ALEXANDER, Philip. Jour. Sci. 44 (1931) 340.

*Limonia subnubeculosa* ESAKI, et al., Icon. Insect. Japan, Ed. 2 (1950) 1515, fig.

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1950 (*Issiki-Ito*).

In the past, attempts have been made to separate *nubeculosa* of the western Palæarctic Region, *subnubeculosa* of the eastern Palæarctic Region, and *sciophila* of the western Nearctic Region. Over the years very abundant materials of all of these supposed species have become available and it does not now appear that they can be maintained, even subspecifically. The species *nubeculosa* as thus interpreted has an almost unbroken Holarctic distribution, being lacking only in the eastern Nearctic Region.

## 86. LIMONIA (LIMONIA) PLUTONES Alexander.

*Limonia plutonis* ALEXANDER, Philip. Jour. Sci. 24 (1924) 552-553.

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1950 (*Issiki-Ito*).

A male specimen, the largest that I have yet seen (length, about 14 millimeters; wing 21). The strict subgeneric position of this fly remains in question. Although the venation is as in the typical subgenus, the structure of the hypopygium is more as in *Libnotes*, wherein it may perhaps be better placed.

## 87. LIMONIA (LIBNOTES) AMATRIX Alexander.

*Limnobia amatrix* ALEXANDER, Insec. Inscit. Menst. 10 (1922) 181-182.

TOSA: Iwai, near Imanoyama, altitude 200 meters, May 13, 1951 (*Issiki-Ito*).

## 88. LIMONIA (LIBNOTES) DIVARICATA Alexander.

*Limonia divaricata* ALEXANDER, Ent. Soc. America Ann. 17 (1924) 61.

TOSA: Asizuri-misaki, May 10, 1951 (*Issiki-Ito*).

## 89. LIMONIA (LIBNOTES) UNDULATA (Matsumura).

*Libnotes undulatus* MATSUMURA, Thous. Ins. Japan, Addit. 2 (1916) 467-468, pl. 25, fig. 8 (entire ♀).

IYO: Mount Saragamine, altitude 1,271 meters, July 22, 1949 (*Ishihara*).

## 90. LIMONIA (DISCOBOLA) MARGARITA (Alexander).

*Discobola margarita* ALEXANDER, Philip. Jour. Sci. 24 (1924) 539-540.

*Limonia (Discobola) margarita* ALEXANDER, Philip. Jour. Sci. 42 (1930) 508.

TOSA: Mount Imanoyama, altitude 865 meters, May 12, 1951 (*Issiki-Ito*).

Widely distributed in eastern Asia, from northern Korea, Karafuto and Hokkaido, south to Formosa.

## 91. LIMONIA (RHIPIDIA) LACONTEI Alexander, subsp.

*Rhipidia maculata* MEIGEN, Syst. Besch. 1 (1818) 153, pl. 5, fig. 11.

*Limonia (Rhipidia) maculata* EDWARDS, Soc. Brit. Ent. Trans. 5 (1938) 45, pl. 3, fig. 3 (wing).

*Limonia (Rhipidia) maculata lecontei* ALEXANDER, Amer. Midl. Nat. 24 (1940) 624-625.

*Rhipidia maculata* ESAKI, et al., Icon. Insect. Japan, Ed. 2 (1950) 1518, fig.

IYO: Mount Ishizuchi, Koguti, altitude 1,400 meters, June 8, 1950 (*Issiki-Ito*).

The earliest name for this species of crane-fly, *maculata* Meigen, 1818, is preoccupied by a still earlier use of the same specific name by Meigen, 1804. The oldest subspecific name that is available to replace the name *maculata* appears to be *lecontei*, as above cited. The possibility exists however that some other species in the Asiatic fauna may be found to be only subspecifically distinct and earlier and so have to replace the present combination. In this state of confusion it seems better to use the name as above given until the matter is finally settled.

This crane-fly appears to have a vast range throughout much of the Holarctic Region.

92. *LIMONIA (RHIPIDIA) PULCHRA* (de Meijere).

*Rhipidia pulchra* DE MEIJERE, Bijd. tot Dierkunde 17 (1904) 92, pl. 8, fig. 7 (entire insect, colored).

*Dicranomyia pulchra* DE MEIJERE, Tijd. voor Ent. 54 (1911) 27-28, pl. 2, figs. 14-16 (antenna, ♂ hypopygium).

*Rhipidia pulchra septentrionis* ALEXANDER, Can. Ent. 45 (1913) 206-207, pl. 3, fig. 1 (wing).

*Rhipidia pulchra septentrionis* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1518, fig.

IYO: Dogo, near Matsuyama, April 27, 1947 (Yano).

It no longer appears advisable to recognize the subspecies *septentrionis*.

93. *LIMONIA (DICRANOMYIA) IMMODESTOIDES* (Alexander).

*Dicranomyia immodestoides* ALEXANDER, Ent. Soc. America Ann. 12 (1919) 327-328.

*Limonia (Dicranomyia) immodestoides* ALEXANDER, Philip. Jour. Sci. 42 (1930) 507.

*Dicranomyia iowensis* ROGERS, Florida Ent. 9 (1926) 49-52, figs.

*Limonia (Dicranomyia) iowensis* ALEXANDER, Dipt. Conn. Fasc. 1 (1942) 319-320, fig. 35, K (♂ hypopygium).

*Dicranomyia immodestoides* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1517, fig.

IYO: Ishii-mura, near Matsuyama, March 30, 1949 (Yano); Ojoin, near Niihama, April 13, 1949 (Miyatake).

The species is wide-spread in central and eastern Asia. It appears, moreover, that the Nearctic *iowensis* is the same species. With such a distribution, it might be expected that the fly would likewise occur in the western Palearctic Region but this does not seem to be the case. The species in that fauna having cell  $M_2$  of the wings open, including *aperta* Wahlgren and *patens* Lundstrom (a synonym of *brevivena* Osten Sacken), both belong to entirely distinct groups of the subgenus and are entirely different from the present fly.

94. *LIMONIA (DICRANOMYIA) LONGIPENNIS* (Schummel).

*Limnobia longipennis* SCHUMMEL, Beitr. zur Ent. (1829) 104.

*Dicranomyia immenor* OSTEN SACKEN, Acad. Nat. Sci. Philadelphia. Proc. (1861) 287.

*Limonia (Dicranomyia) longipennis* ALEXANDER, Dipt. Conn. Fasc. 1 (1942) 321, fig. 36, B (♂ hypopygium).

TOSA: Simoka-waguti, May 10, 1951 (Issiki-Ito).

A male specimen, entirely typical, except that the ventral dististyle of one side shows three rostral spines, the two normal ones, with an additional spine about two-thirds as long, placed on the side of the prolongation.

The species is wide-spread throughout the entire Holarctic Region.

95. *LIMONIA (DICRANOMYIA) MONOSTROMIA* Tokunaga.

*Limonia (Dicranomyia) monostromia* TOKUNAGA, Kyoto Imp. Univ., Coll. Agr. Mem. 10 (1930) 1-93, 17 pls.; Mushi 7 (1934) 90-96.  
*Dicranomyia monostromia* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1517, fig.

TOSA: Simoka-waguti, May 10, 1951 (*Issiki-Ito*).

Originally described from the Kii Peninsula, Honshu. The basic paper above cited by Dean Tokunaga is one of the outstanding studies ever made on any insect.

The only near relative of the fly at present known is *Limonia (Dicranomyia) marmorata* (Osten Sacken) (*signipennis* Coquillett) which likewise has a marine larva and is very close to the present fly. Tokunaga [(1930) 58] has provided a detailed comparison of the two forms, including all four stages. The most complete paper yet published on *marmorata* is by Saunders.<sup>2</sup>

From the structure of the antennæ, a reference of the species to the subgenus *Idioglochina* Alexander is suggested but I am following current usage in placing the fly as is done herewith. It may be noted that the larvæ of all species of *Idioglochina*, as far as this has been determined, have a marine habit.

96. *LIMONIA (DICRANOMYIA) NANKAIDCENSIS* sp. nov.

Plate 3, figs. 16, 17.

Belongs to the *morio* group and subgroup; fore femora blackened except basally; wings weakly darkened, the prearcular field yellowed; stigma darker brown, preceded and followed by major whitened areas; basal abdominal segments bicolored, black, with more than the outer half yellowed, the sixth and succeeding segments uniformly black; male hypopygium with the tergite terminating in two stout lobes that are separated by a circular notch; dorsal dististyle acute at apex; ventral dististyle profoundly bifid; gonapophysis uniformly blackened, the apex obtusely rounded and slightly decurved; aedeagus relatively narrow, obtuse at tip.

*Male*.—Length, about 5 to 5.5 millimeters; wing, 5.8 to 6.5.

Rostrum and palpi black. Antennæ black throughout; flagellar segments long-oval, constricted into narrow paler

<sup>2</sup> Saunders, L. G. Ent. Soc. America Ann. 21 (1928) 521-545, fig. 7 (details of all stages). As *signipennis* Coquillett, from the Pacific coast of North America.

basal pedicels. Head behind black, the front and anterior vertex silvery white.

Thorax polished black, the pronotum and a very broad dorsal pleural stripe silvery gray. Halteres with stem yellow, knob dark brown. Legs with the coxæ polished black, the extreme tips yellowed; trochanters yellow; fore femora black, restrictedly brightened basally, remaining femora yellow, the tips narrowly brownish black; tibiae obscure yellow, the tips narrowly and vaguely darkened; tarsi obscure yellow, the outer segments darker. Wings (Plate 3, fig. 16) weakly darkened, the prearcular field yellowed; stigma oval, darker brown, with extensive more whitened areas before and beyond it; veins brown, yellow in the prearcular field. Venation:  $Sc_1$  long, ending opposite origin of  $R_s$ ;  $R_2$  and free tip of  $Sc_2$  both pale, in transverse alignment; m-cu close to fork of M.

Basal abdominal segments bicolored, black, with more than the outer half yellow; on the fifth segment the amount of the two colors is equal; sixth and succeeding segments, including hypopygium, black. Male hypopygium (Plate 3, fig. 17) with the tergite, *9t*, broad, narrowed outwardly, terminating in two stout lobes that are separated by a circular notch. Ventromesal lobe of basistyle, *b*, small. Dorsal dististyle, *dd*, acute at apex. Ventral dististyle, *vd*, profoundly bifid, the lower arm longest, a little dilated at outer end, without a rostral spine. Gonapophysis, *g*, uniformly blackened, the apex rounded and slightly decurved. Ædeagus, *a*, relatively narrow, obtuse at tip.

*Habitat*.—Japan (Shikoku).

Holotype, male, Mount Tsurugi, Awa, altitude 1,400 to 1,955 meters, May 31, 1950 (*Issiki-Ito*). Paratopotypes, 2 males, one pinned with type; paratype, male, Nisigawa, near Yanase, Tosa, altitude 800 meters, May 3, 1951 (*Issiki-Ito*).

This is the first member of the *morio* subgroup to be found in eastern Asia, although rather numerous species occur in Europe and fewer in North America. Among the European species, the present fly is most similar to *Limonia* (*Dicranomyia*) *caledonica* Edwards, which has the abdomen uniformly blackened, and with the details of the male hypopygium distinct, particularly the ventromesal lobe of the basistyle, gonapophyses and ædeagus.

97. *LIMONIA* (*DICRANOMYIA*) *POLI* Alexander.

*Limonia* (*Dicranomyia*) *fullowayi* ALEXANDER, Philip. Jour. Sci. 63 (1937) 373; nec *fullowayi* ALEXANDER, Can. Ent. 47 (1915) 79-80.

*Limonia (Dicranomyia) fullowayi* ALEXANDER, Notes d'Ent. Chinoise (5) 4 (1937) 70.

*Limonia (Dicranomyia) poli* ALEXANDER, Philip. Jour. Sci. 76 (1941) 44, pl. 1, fig. 11 (venation), pl. 3, fig. 35 (♂ hypopygium).

IYO: Matsuyama, November 3, 1951 (Yano).

Widespread in eastern Asia, as far west as Szechwan, China.

98. **LIMONIA (DICRANOMYIA) PSEUDOMORIO** (Alexander).

*Dicranomyia pseudomorio* ALEXANDER, Amer. Ent. Soc. Trans. 46 (1920) 3-4.

*Limonia (Dicranomyia) pseudomorio* ALEXANDER, Philip. Jour. Sci. 51 (1933) 370.

IYO: Mount Ishizuchi, altitude 1,200 meters, August 10, 1925 (Harukawa).

99. **LIMONIA (DICRANOMYIA) TAKEUCHII** (Alexander).

*Dicranomyia takeuchii* ALEXANDER, Insec. Inscit. Menst. 10 (1922) 179-180.

*Dicranomyia takeuchii* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1516, fig.

IYO: Mount Ishizuchi, altitude 1,400 meters, to Koguti, altitude 300 meters, June 11, 1950 (Issiki-Ito).

100. **LIMONIA (GERANOMYIA) AVOCETTA** (Alexander).

*Geranomyia avocetta* ALEXANDER, Can. Ent. 45 (1913) 205-206, pl. 3, fig. 8 (wing), pl. 4, figs. 5-7 (♂ hypopygium).

IYO: Sugitate, November 1, 1951 (Ishihara).

101. **LIMONIA (THRYPTICOMYIA) UNISSETOSA** Alexander.

*Thrypticomomyia arcuata* ALEXANDER, Amer. Ent. Soc. Trans. 46 (1920) 4; preoccupied by *Limonia (Peripheroptera) arcuata* ALEXANDER, Ent. News 24 (1913) 411-412.

*Limonia (Thrypticomomyia) unisetosa* ALEXANDER, Philip. Jour. Sci. 40 (1929) 248.

IYO: Dogo, near Matsuyama, October 14, 1947 (Yano).

102. **HELIUS (HELIUS) TENUIROSTRIS** Alexander.

*Helius (Helius) tenuirostris* ALEXANDER, Philip. Jour. Sci. 24 (1924) 560-561.

*Helius tenuirostris* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1519, fig.

IYO: Mount Ishizuchi, altitude 1,000 meters, August 10, 1925 (Harukawa).

TOSA: Iwai, near Imanoyama, altitude 200 meters, May 11, 1951 (Issiki-Ito).

103. **ELLIPTERA ZIPANGUENSIS** Alexander.

*Elliptera zipanguensis* ALEXANDER, Philip. Jour. Sci. 24 (1924) 559-560.

TOSA: Iwai, near Imanoyama, altitude 200 meters, May 11, 1951 (*Issiki-Ito*).

Widely distributed over the Japanese islands, with a poorly differentiated geographical race in the mountains of Formosa.

104. *ANTOCHA (ANTOCHA) BIFIDA* Alexander.

*Antocha (Antocha) bifida* ALEXANDER, Philip. Jour. Sci. 24 (1924) 564-566, pl. 2, fig. 10 (♂ hypopygium).

TOSA: Nisigawa to Kokusen, near Yanase, altitude 600 meters, May 4, 1951 (*Issiki-Ito*): Iwai, near Imanoyama, altitude 200 meters, May 11, 1951 (*Issiki-Ito*).

This is one of the most widely distributed of all known members of the genus, occurring from northern Korea through the main Japanese islands to Formosa, thence westward to Szechwan, western China.

105. *ANTOCHA (ANTOCHA) DILATATA* Alexander.

*Antocha (Antocha) dilatata* ALEXANDER, Philip. Jour. Sci. 24 (1924) 566-567, pl. 2, fig. 14 (♂ hypopygium).

TOSA: Iwai, near Imanoyama, altitude 200 meters, May 11, 1951 (*Issiki-Ito*).

106. *ANTOCHA (ANTOCHA) SATSUMA* Alexander.

*Antocha (Antocha) satsuma* ALEXANDER, Ent. Soc. America Ann. 12 (1919) 332.

*Antocha Satsuma* ESAKI, et al., Icon Insect. Japon, Ed. 2 (1950) 1519, fig.

IYO: Iwazeki, near Matsuyama, March 9, 1949 (*Yano*).

107. *ANTOCHA (ANTOCHA) SUBCONFLUENTA* Alexander.

*Antocha (Antocha) subconfluenta* ALEXANDER, Philip. Jour. Sci. 42 (1930) 516-517, pl. 1, fig. 6 (venation), pl. 2, fig. 25 (♂ hypopygium).

TOSA: Nisigawa to Kokusen, near Yanase, altitude 600 meters, May 4, 1951 (*Issiki-Ito*).

The distinctly subterminal dististyles of the male hypopygium should be noted.

## HEXATOMINI

108. *AUSTROLIMNOPHILA KIRISHIMENSIS* (Alexander).

*Limnophila kirishimensis* ALEXANDER, Ent. Soc. America Ann. 17 (1924) 438-439.

IYO: Sugitate, November 1, 1951 (*Ishihara*).

109. *EPIPHRAGMA (EPIPHRAGMA) EVANESCENS* Alexander.

*Epiphragma (Epiphragma) evanescens* ALEXANDER, Lingnan Sci. Jour. 19 (1940) 130-131, fig. 6 (venation).

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1950 (*Issiki-Ito*); Omogokei, July 21, 1949 (*Miyatake*).

The type was from Chekiang, eastern China; a paratype from Wakayama, Honshu, Japan.

110. **EPIPHRAGMA (EPIPHRAGMA) SUBFASCIPENNIS** Alexander.

*Epiphragma subfascipennis* ALEXANDER, Amer. Ent. Soc. Trans. 46 (1920) 10-11.

*Epiphragma subfascipennis* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1522, fig.

AWA: Mount Tsurugi, Minokosi, altitude 1,400 meters, to Nagoro, altitude 900 meters, June 10, 1950 (*Issiki-Ito*).

IYO: Mount Ishizuchi, altitude 1,400 meters, June 1, 1950 (*Issiki-Ito*).

111. **EPIPHRAGMA (EPIPRAGMA) SUBINSIGNIS** Alexander.

*Epiphragma subinsignis* ALEXANDER, Amer. Ent. Soc. Trans. 46 (1920) 11-12.

*Epiphragma subinsignis* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1522, fig.

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1950 (*Issiki-Ito*).

112. **PSEUDOLIMNOPHILA INCONCUSSA** Alexander.

*Limnophila inconcussa* ALEXANDER, Can. Ent. 45 (1913) 313-314, pl. 4, fig. 2 (wing), pl. 10, fig. 12 (♂ hypopygium).

*Pseudolimnophila inconcussa* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1522, fig.

IYO: Dogo, Matsuyama, April 19, 1947 (*Yano*); Matsuyama, at light trap, October 11, 1948 (*Ishihara-Miyatake*).

TOSA: Iwai, near Imanoyama, altitude 200 meters, May 11, 1951 (*Issiki-Ito*).

113. **LIMNOPHILA (PRIONOLABIS) AURIBASIS** Alexander.

*Limnophila (Prionolabis) auribasis* ALEXANDER, Ent. Mag. (Kyoto) 3 (1919) 126.

*Limnophila (Prionolabis) auribasis* ALEXANDER, Ent. Soc. America Ann. 11 (1918) 446.

*Limnophila auribasis* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1524, fig.

IYO: Misaka-toge, altitude 716 meters, May 3, 1951 (*Yano*); Mount Saragamine, altitude 1,271 meters, May 8, 1949 (*Miyatake*).

TOSA: Nisigawa to Yanase, altitude 600 to 800 meters, May 3 to 4, 1950 (*Issiki-Ito*).



114. *LIMNOPHILA (PRINOLABIS) ODAI* Alexander.

*Limnophila (Prionolabis) odai* ALEXANDER, Philip. Jour. Sci. 51 (1933)  
400-401, pl. 1, fig. 20 (venation), pl. 4, fig. 50 (♂ hypopygium).

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1950 (*Issiki-Ito*).

The male hypopygium was not fully described at the time of definition of the species. Median region of tergite produced, the margin weakly trilobed, the median lobe a trifle larger; surface of the produced part microscopically roughened. Inner dististyle with two major spines and, in cases, a still smaller outer one.

115. *LIMNOPHILA (PRIONOLABIS) SUBMUNDA* Alexander.

*Limnophila (Prionolabis) submunda* ALEXANDER, Ent. Mag. (Kyoto) 3 (1919) 125-126.

*Limnophila (Prionolabis) submunda* ALEXANDER, Ent. Soc. America Ann. 11 (1918) 446.

AWA: Mount Tsurugi, Kawati and Nagaro to Minokosi, altitude 900 meters to 1,400 meters, May 30 to June 1, 1950; altitude 1,400 to 1,955 meters, May 31, 1950 (*Issiki-Ito*).

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1900 (*Issiki-Ito*).

116. *LIMNOPHILA (LIMNOPHILA) JAPONICA* Alexander.

*Limnophila (Pæcilostola) japonica* ALEXANDER, Can. Ent. 45 (1913) 316-317, pl. 3, fig. 2 (wing), pl. 10, fig. 10 (♂ hypopygium).

*Limnophila japonica* ESAKI, et al., Icon. Insect. Japon, Ed. 2 (1950) 1523, fig.

IYO: Ojoin, near Niihama, April 14, 1949 (*Miyatake*).

117. *LIMNOPHILA (DICEANOPHRAGMA) MICROSPILA* sp. nov.      Plate 3, figs. 18, 19.

General coloration of mesonotum brownish gray, the præscutum with three stripes that are separated by delicate brown lines of the interspaces; halteres and legs yellow; wings whitish subhyaline, abundantly dotted and spotted with brown in all cells; wings narrower than in the corresponding sex of *taiwanensis*; abdomen dark brown; male hypopygium with the outer dististyle unequally bidentate at apex; gonapophysis with the apical blade conspicuously dilated on the inner or mesal margin.

*Male*.—Length, about 6 to 6.5 millimeters; wing, 7 to 7.1; antenna, about 1.2.

*Female*.—Length, about 8 millimeters; wing, 7.5.

Rostrum and palpi brownish black. Antennæ with the scape and pedicel dark brown, proximal two or three flagellar segments yellowed, the remainder brown; segments long-subcylindrical.

drical, a little shorter than the longest verticils. Head dark brown, sparsely pruinose.

Pronotum brown. Mesonotum brownish gray, including three præscutal stripes that are separated by three delicate brown lines of the interspaces, lateral borders more broadly brown; pseudosutural foveæ and tuberculate pits black; posterior sclerites of notum brownish gray, the caudal part of the mediotergite more darkened. Pleura dark gray, variegated by dark brown spots to form broken longitudinal lines, with a larger area on the ventral sternopleurite. Halteres uniformly pale yellow. Legs with the coxæ brownish yellow, the tips darker; trochanters yellow; remainder of legs yellow, the outer tarsal segments brown. Wings (Plate 3, fig. 18) whitish subhyaline, with an abundant dotted and spotted brown pattern in all cells, the major areas relatively small, located at origin of Rs, along cord, stigma and as a more or less distinct concentration at and near the supernumerary crossvein; all other cells with several dots, separated or slightly confluent, including many in cell M; prearcular field light yellow; veins pale, a trifle darker in the patterned areas. Wings markedly narrower than in the corresponding sex of *taiwanensis*. Venation  $R_{1+2}$  only a trifle longer than  $R_2$ ; supernumerary crossvein in cell  $R_3$  about twice its own length from tip; cell 1st  $M_2$  small, short-rectangular, with m-cu at or just before midlength; cell  $M_1$  longer than its petiole.

Abdomen dark brown, the hypopygium somewhat brightened, especially the proximal halves of the basistyles. Male hypopygium (Plate 3, fig. 19) with the outer dististyle, *d*, slender, unequally bidentate at tip, the outer spine more slender; inner dististyle narrowed and darkened at apex, at base on outer face with a concentration of setæ. Phallosome complex, appearing about as shown. Gonapophysis, *g*, with the apical blade conspicuously dilated on its inner or mesal margin.

*Habitat*.—Japan (Shikoku).

Holotype, male, Mount Ishizuchi, Koguti, Iyo, altitude 1,400 meters, June 8, 1950 (*Issiki-Ito*). Allotype, female, Mount Tsurugi, Awa, Minokosi, altitude 1,400 meters, to Nagoro, altitude 900 meters, June 1, 1950 (*Issiki-Ito*). Paratype, male, Mount Tsurugi, Sugeoi, June 4, 1950 (*Issiki-Ito*).

In its abundantly dotted and spotted wings, the present fly is closest to *Limnophila* (*Dicranophragma*) *taiwanensis* Alexander, which differs in details of coloration and in the broader wings. Of the species occurring on the main Japanese islands,

it is closest to *L. (D.) upsilon* Alexander, which has a very weak dotting in the cells of the wing but is quite distinct, with cell M faintly and evenly washed with brown, and in other characters.

118. *LIMNOPHILA (ELÆOPHILA) DIETZIANA* Alexander.

*Limnophila (Ephelia) dietziana* ALEXANDER, Ent. Soc. America Ann. 17 (1924) 437-438.

TOSA: Iwai, near Imanoyama, altitude 200 meters, May 11, 1951 (*Issiki-Ito*).

119. *LIMNOPHILA (ELÆOPHILA) SUBAPRILINA* Alexander.

*Limnophila (Ephelia) subaprilina* ALEXANDER, Ent. Soc. America Ann. 12 (1919) 340-341.

IYO: Iwazeki, near Matsuyama, April 29, 1949 (*Yano*).

120. *LIMNOPHILA SUBNEMORALIS* Alexander.

*Limnophila subnemoralis* ALEXANDER, Ann. and Mag. Nat. Hist. (9) 15 (1925) 73.

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1950 (*Issiki-Ito*).

121. *PILARIA TOKIONIS MELANOTA* Alexander.

*Limnophila (Eulimnophila) tokionis* ALEXANDER, Amer. Ent. Soc. Trans. 46 (1920) 13.

*Pilaria melanota* ALEXANDER, Insec. Inscit. Menst. 10 (1922) 185.

AWA: Mount Tsurugi, Sugeoi, June 4, 1950 (*Issiki-Ito*).

IYO: Mount Ishizuchi, altitude 1,400 to 1,981 meters, June 9, 1950 (*Issiki-Ito*).

It now appears that the fly with intensely blackened mesonotum (*melanota*) is at most subspecifically distinct from *tokionis* which has the mesonotum reddish brown.

122. *HEXATOMA (ERIOCERA) CERBERUS* sp. nov.

Plate 3, fig. 20.

General coloration of body, including palpi, antennæ and halteres, intense black; legs black, the subbasal portions of femora vaguely brightened, the extreme base black; wings with a strong blackish tinge, vaguely patterned with still darker; macrotrichia of veins beyond cord very sparse to lacking, most persistent on distal section of vein  $R_5$ .

*Male*.—Length, about 14 millimeters; wing, 12; antenna, about 4.2.

Rostrum and palpi black. Antennæ (male) 7-segmented, relatively long, black throughout; first flagellar segment longer and stouter; two, three, and four subequal, last segment shortest; segments elongate-cylindrical, with dense setæ. Head velvety

black; vertical tubercle moderately conspicuous, somewhat compressed in front.

Thorax intensely black, the scutellum with a golden brown pollen, visible only when viewed obliquely from in front. Halteres short, black. Legs black, the subbasal portions of femora vaguely brightened, most evident and more extensive on the fore legs, the actual bases very narrowly black. Wings (Plate 3, fig. 20) with a strong blackish tinge, the prearcular and coastal regions, together with the small stigma, still darker; slightly darker clouds at origin of  $R_s$  and over the cord; veins Cu and second A seamed with darker; veins brown. Macrotrichia, of veins beyond cord very sparse to lacking, most persistent on distal section of vein  $R_5$ . Venation:  $Sc_1$  ending about opposite one-third to one-fourth the length of  $R_{2+3}$ ,  $Sc_2$  opposite the fork of  $R_{2+3+4}$ ;  $R_{2+3}$  and  $R_3$  subequal;  $R_{2+3+4}$  suberect shorter than basal section of  $R_5$ ; cell  $M_1$  lacking; m-cu about two-thirds its length beyond fork of M.

Abdomen, including hypopygium, intensely black, the surface dull.

*Habitat*.—Japan (Shikoku).

Holotype, male, Omogokei, Iyo, July 17, 1950 (*Ishihara*).

The most similar species in the Japanese fauna include *Hexatoma* (*Eriocera*) *fulvibasis* Alexander, *H. (E.) kamiyai* Alexander, and *H. (E.) kariyai* Alexander, all of which differ in the coloration of the body, legs and wings, and in details of structure and venation. The present fly is the darkest colored of the various species of *Eriocera* so far recorded from the main Japanese islands.

123. *HEXATOMA (ERIOCERA) GIFUENSIS* Alexander.

*Hexatoma* (*Eriocera*) *gifuensis* ALEXANDER, Philip. Jour. Sci. 52 (1933) 153–155, pl. 1, fig. 15 (venation), pl. 2, fig. 33 (♂ hypopygium).

Iyo: Matsuyama, September 14, 1947 (*Ishihara*).

The types, from Gifu, Honshu, were preserved in alcohol, causing some discoloration. Supplementary data are provided to cover certain points.

Head brownish yellow, including the large globular vertical tubercle, the summit of the latter darker brown. Mesonotum chiefly brownish gray, patterned with darker brown, including four præscutal stripes, the intermediate pair separated by a capillary line that is less distinct than the sublateral interspaces; centers of scutal lobes blackened. Mesonotum, espe-

cially the præscutum, with dense long pale setæ. Femora and tibiæ narrowly but distinctly darkened at tips. Wings with a weak spur on r-m, jutting basad into cell R; m-cu a short distance beyond the fork of M. Abdomen yellow, the posterior borders of the second and succeeding tergites narrowly infuscated, the amount increasing on the outer segments, the small hypopygium and the preceding segment uniformly dark brown.

124. *HEXATOMA (ERIOCERA) IMPERATOR* sp. nov.

Plate 3, fig. 21.

Size large (wing, male, over 16 millimeters); general coloration black; antennæ (male) very long, approximately twice the wing or body; legs black, the femoral bases broadly yellow; wings with a strong dusky suffusion, the prearcular field yellowed; cell  $M_1$  present.

*Male*.—Length, about 15 to 17 millimeters; wing, 17 to 18; antenna, about 33 to 35.

Rostrum brownish black; palpi black. Antennæ (male) brownish black throughout, very long, as shown by the measurements, being approximately twice the wing or body; emergence spines of the more proximal segments unusually long and delicate, on the outer segments passing into normal setæ. Head brownish black; vertical tubercle relatively large and bulbous; head with very long and abundant erect dark setæ.

Thorax almost uniformly brownish black, the præscutum with abundant erect dark setæ, those of the posterior sclerites shorter, on the postnotum and pleura sparse to virtually lacking. Halteres dark brown, the knobs still darker, base of stem very narrowly brightened. Legs with the coxæ brownish black, with conspicuous setæ; trochanters brownish black; remainder of legs black, the femoral bases yellow, on the posterior legs including nearly the basal third. Wings (Plate 3, fig. 21) with a strong dusky suffusion, the stigma a trifle darker but inconspicuous; prearcular field short, conspicuously yellowed, including the veins; remaining veins a little darker than the ground. Sparse short macrotrichia on outer radial veins, even fewer on veins  $M_1$ ,  $M_2$  and distal section of  $M_3$ . Venation:  $R_{2+3+4}$  variable, from a little less than  $R_{2+3}$  to about one-half as long; cell  $M_1$  present, subequal to or a little shorter than its petiole; m-cu from one-third to two-thirds its length beyond the fork of M.

Abdomen black, including hypopygium.

*Habitat*.—Japan (Shikoku).

Holotype, male, Odamiyama, Iyo, July 27, 1948 (*Hirohisa Hagimori*).

Paratype, male, Omogokei, Iyo, July 25, 1951 (*Miyatake*).

*Hexatoma* (*Eriocera*) *imperator* is quite distinct from the other regional species that have cell  $M_1$  of the wings preserved and with the antennæ of the male greatly lengthened, including *H. (E.) stricklandi* (Edwards). The general black color and pattern of the legs and wings readily separate the fly from these allied species.

### ERIOPTERINI

125. *LIPSOTHRIX LEUCOPEZA* sp. nov.

Plate 3, fig. 22.

General coloration of mesonotum light brown to darker brown, without pattern, the pleura paler; antennæ short; femora dirty white, the tibiæ and tarsi snowy white; wings with a weak brown tinge, unpatterned; basal section of  $R_5$  only a little shorter than  $R_{2+3+4}$ ; cell 1st  $M_2$  large, subequal to distal section of vein  $M_3$  or longer; m-cu close to fork of  $M$ .

*Male*.—Length, about 6 millimeters; wing, 6.5.

*Female*.—Length, about 6.5 millimeters; wing, 6.5.

Rostrum and palpi yellow. Antennæ short, brown; flagellar segments oval, much shorter than the verticils. Head brown.

Thoracic dorsum almost uniformly light brown or testaceous brown, the pleura and pleurotergite more testaceous yellow. In the female, the general coloration of the thorax is darker brown. Halteres whitened, the knobs a little infuscated. Legs with the coxæ and trochanters yellow; femora dirty white, the tips clearer white; tibiæ and tarsi snowy white. Wings (Plate 3, fig. 22) with a weak brownish tinge, entirely unpatterned; veins pale brown. Venation:  $Sc_1$  ending a short distance beyond fork of  $R_s$ ,  $Sc_2$  near its tip;  $R_{1+2}$  and  $R_2$  subequal; basal section of  $R_5$  only a little shorter than  $R_{2+3+4}$ ; cell first  $M_2$  large, in male subequal to the distal section of  $M_{1+2}$ , somewhat shorter in female; m-cu at or just before or beyond the fork of  $M$ ; cell second A moderately broad.

Abdomen of male brownish yellow, the subterminal sternites darker, hypopygium yellow. In female, abdomen such darker brown; hypovalvæ relatively slender, much longer than the gently upcurved cerci.

*Habitat*.—Japan (Shikoku).

Holotype, male, Totidani, near Yanase, Tosa, altitude 400 meters, May 2, 1951 (*Issiki-Ito*). Allotopotype, female, pinned with type.

The most similar species in *Lipsothrix taiwanica* Alexander, which differs in the coloration of the legs and in the venation, especially of the radial and outer medial fields.

## 126. GONOMYIA (IDIOCERA) SHANTUNGENSIS Alexander.

*Gonomyia* (*Ptilostena*) *shantungensis* ALEXANDER, Philip. Jour. Sci. 42 (1930) 77-78, pl. 2, fig. 32 (♂ hypopygium).

IYO: Dogo, Matsuyama, April 20, 1947, October 3, 1947 (Yano).

## Genus ERIOPTERA Meigen

## HOPLOERIOPTERA Subgen. nov.

Rostrum short. Antennæ 16-segmented; no fusion of segments; flagellar segments with very long verticils. Legs with long simple setæ only; no tibial spurs; claws long and slender, virtually straight. Pot-bellied condition of the meron less developed than in typical *Erioptera*. Wings with Sc<sub>2</sub> evidently lacking; Rs relatively short, a little less than vein R<sub>3</sub>; cell 1st M<sub>2</sub> closed; m-cu about two-thirds to fully its own its length beyond the fork of M; vein 2nd A virtually straight, with a slight outer sinuosity. Long abundant trichia on veins. Male hypopygium with two terminal dististyles. Ædeagus long and slender, the tip decurved, simple. Gonapophyses appearing as slender curved spines. Tergal plate undeveloped.

*Type of subgenus.*—*Erioptera* (*Hoplerioptera*) *shikokuensis* sp. nov. (Eastern Palearctic Region). *Erioptera* (*Hoplerioptera*) *luctuosipes* sp. nov., likewise belongs here.

I am placing this group as a subgenus under *Erioptera* Meigen, though with some doubt and it may well be found to represent a valid genus. In some respects it suggests *Gnophomyia* Osten Sacken but I believe that the association with *Erioptera* is more nearly correct.

## 127. ERIOPTERA (HORPLERIOPTERA) SHIKOKUENSIS sp. nov. Plate 4, figs. 23, 24,

General coloration pale yellow; legs brownish yellow; wings pale yellow, cell 1st M<sub>2</sub> closed; male hypopygium with two dististyles, the outer a long flattened ribbonlike blade with a short black spine at base, the inner style shorter, terminating in two strong spines; gonapophyses appearing as two simple curved black spines; ædeagus long and slender, its tip decurved.

*Male.*—Length, about 4.5 to 5 millimeters; wing, 5.5 to 6; antenna, about 0.9 to 1.0.

*Female.*—Length, about 5.5 millimeters; wing, 6.

Rostrum brownish yellow; palpi a little darker. Antennæ yellowish brown; flagellar segments subcylindrical, with very long conspicuous verticils that exceed the segments. Head yellow; anterior vertex broad.

Thorax uniformly pale yellow. Halteres short, pale yellow throughout. Legs with the coxæ and trochanters pale yellow;

remainder of legs more brownish yellow, this color more obscured by abundant dark trichia. Wings (Plate 4, fig. 23) pale yellow, a trifle more saturated at base; veins yellowish brown. Venation: As described under the subgenus; Sc long, Sc<sub>1</sub> ending nearly opposite R<sub>2</sub>; R<sub>2+3</sub> about one-third R<sub>2+3+4</sub>; m shorter than basal section of M<sub>3</sub>.

Abdomen, including hypopygium, yellow. Male hypopygium (Plate 4, fig. 24) with the outer dististyle, *d*, a long flattened ribbonlike blade, the tip obtuse, near base on outer margin with a curved black spine. Inner dististyle, *d*, about one-half as long, at apex with two strong spines, one a trifle more curved than the other; apex of stem of style produced slightly beyond the level of the spines as a conical point. Gonapophysis, *g*, appearing as a simple curved black spine. Ædeagus, *a*, long and slender, slightly dilated beyond midlength, the simple apex decurved.

*Habitat*.—Japan (Shikoku).

Holotype, male, Mount Tsurugi, Awa, Minokosi, altitude 1,400 meters, to Nagoro, 900 meters, June 1, 1950 (*Issiki-Ito*). Allotopotype, female, pinned with type. Paratopotypes, 6 males and females, with the types.

The only close relative is the species next described as *Erioptera* (*Hoplærioptera*) *luctuosipes* sp. nov., where the two species are compared. Superficially the present fly suggests species of *Erioptera* (*Psiloconopa*), such as *E. (P.) sachalina* Alexander, *E. (P.) subareolata* Alexander, and *E. (P.) yezoana* Alexander, differing in the subgeneric characters.

123. ERIOPTERA (HOPLÆRIOPTERA) LUCTUOSIPES sp. nov. Plate 4, figs. 25, 26.

General coloration whitish yellow, the præscutum with four more reddish stripes; legs with the coxæ and trochanters yellow, the remainder abruptly brownish black to black; wings tinged with yellow, the prearcular and costal fields paler yellow; male hypopygium with the outer dististyle a long simple darkened blade; inner dististyle narrowed outwardly, terminating in a long straight spine, with a second smaller spine on the face at near midlength; gonapophysis strongly curved into a long spine; with a small point on outer margin at near two-thirds the length; ædeagus relatively short, conspicuously flanged except on the short apex.

*Male*.—Length, about 5 to 5.5 millimeters; wing 6 to 6.5.

*Female*.—Length, about 5.5 to 6 millimeters; wing 6.5 to 7.



Rostrum obscure yellow; palpi black. Antennæ black, the scape paler; flagellar segments long-oval to subcylindrical, the longest verticils nearly twice the segments. Head yellow.

Thorax chiefly whitish yellow, the præscutum with four more reddish stripes, the centers of the cutal lobes of this same color. Halteres yellow. Legs with the coxæ and trochanters yellow; remainder of legs abruptly brownish black to black. Wings (Plate 4, fig. 25) tinged with yellow, the prearcular and costal fields paler yellow; veins beyond cord brown, the remaining veins more yellowed. Venation:  $R_2$  varying from subequal to  $R_{2+3}$  to twice this length.

Abdomen brownish yellow; hypopygium light yellow. Male hypopygium (Plate 4, fig. 26) with the outer dististyle, *d*, a long simple darkened blade, the apex obtuse, with no basal spine; inner dististyle narrowed outwardly, terminating in a long straight black spine, with a second smaller spine on the face at near midlength. Gonapophysis, *g*, black, strongly curved, narrowed into a long spine, on outer margin at near two-thirds the length with a small point. Ædeagus, *a*, relatively short, subtended by a broad flange, the free apex short.

*Habitat*.—Japan (Shikoku).

Holotype, male, Nisigawa to Yanase, Tosa, altitude 600 meters, May 4, 1951 (*Issiki-Ito*). Allotopotype, female, pinned with type. Paratopotypes, 5 of both sexes; paratypes. Kokusen near Yanase, Tosa, altitude 500 meters, May 5, 1951 (*Issiki-Ito*).

This crane-fly is readily told from the subgenotype, *Erioptera* (*Hoploceriptera*) *shikokuensis* sp. nov., by the blackened legs, and especially in the details of structure of the male hypopygium, including both dististyles, the gonapophyses, and the ædeagus.

129. *ORMOSIA* (*ORMOSIA*) *ATRIPIES* Alexander.

*Ormosia atripes* ALEXANDER, Ent. Soc. America Ann. 12 (1919) 335.

TOSA: Nisigawa to Yanase, altitude 600 meters, May 4, 1951 (*Issiki-Ito*.)

130. *MOLOPHILUS* (*MOLOPHILUS*) *ALBOHALTERATUS* Alexander.

*Molophilus* (*Molophilus*) *albohalteratus* ALEXANDER, Ent. Soc. America Ann. 17 (1924) 435.

IYO: Misaka-toge, altitude 716 meters, May 3, 1951 (*Yano*).

131. *MOLOPHILUS* (*MOLOPHILUS*) *DAIMIO* sp. nov.

Plate 4, fig. 27.

Belongs to the *gracilis* group and subgroup; general coloration polished black, the head above light silvery gray; antennæ (male) relatively long, nearly half the length of the body, the flagellar segments long, with conspicuous outspreading setæ

additional to the shorter verticils; knobs of halteres whitened; fore femora yellow, the outer half black, the remaining femora yellow, tips narrowly blackened, tibiae yellow basally, the tips weakly darkened; wings with a strong blackish suffusion, the prearcular field yellow; costal border at near midlength of wing yellow, the color extended backward into cell  $R_1$ ; male hypopygium with two dististyles, the outer a powerful club or blade, its outer margin coarsely toothed; inner dististyle small, at apex suddenly narrowed into a curved point.

*Male*.—Length, about 4 to 4.3 millimeters; wing, 4.6 to 5; antenna, about 2.

*Female*.—Length, about 5 millimeters, wing, 5.

Rostrum and palpi black. Antennae (male) relatively long, as shown by the measurements; scape black, pedicel brown, flagellum pale brown, more darkened outwardly; segments long-fusiform with truncated ends, longer than the unilaterally distributed verticils; in addition to the latter, the segment with even longer erect pale setae. In female, antennae shorter but still elongate. Head above light silvery gray, darker on the sides.

Thorax uniformly polished black. Halteres with stem dusky, the knob whitened. Legs with the fore coxae dark brown, the remaining coxae, with the trochanters, yellow; fore femora yellow on nearly the proximal half, the remainder black; remaining femora yellow, the tips narrowly and abruptly brownish black, narrowest on the middle pair; fore tibiae brown, darkest at tips, the proximal third yellowed, remaining tibiae brownish yellow, the tips weakly darkened; tarsi brownish black. Wings with a strong blackish suffusion, the prearcular field yellow; costal border at near midlength paler yellow, expanded backward into cell  $R_1$  above  $R_s$ ; veins and macrotrichia dark brown, those at base yellowed. Venation:  $R_2$  in approximate transverse alignment with r-m; petiole of cell  $M_3$  about three times the short m-cu; vein 2nd A relatively long, ending about opposite m-cu.

Abdomen, with the male hypopygium black. Ovipositor with the valves horn-yellow. Male hypopygium (Plate 4, fig. 27) with the basistyle, *b*, produced into a long slender dorsal lobe, *db*, provided with setae; a short stout setiferous mesal lobe, *mb*, and a very broad and low ventral lobe, *vb*, with blackened and thickened borders. Two dististyles, *d*, the outer a powerful blackened club or blade, narrowed at base, dilated outwardly, the outer margin with about six strong teeth, additional to the

outer lateral apical point, with a few smaller denticles lying more basad; inner dististyle much smaller, appearing as a dark blade, narrowed outwardly, suddenly narrowed into a weak apical spine; before the apex with a few microscopic setulæ. Phallosomic plate narrow, glabrous except for scattered setulæ at apex. Ædeagus relatively short, less than twice the phallosomic plate.

*Habitat*.—Japan (Shikoku).

Holotype, male, Imanoyama, Tosa, altitude 800 meters, May 12, 1951 (*Issiki-Ito*). Allotopotype, female, pinned with the type. Paratopotypes, males and females; paratypes, males and females, Kokusen, near Yanase, Tosa, altitude 500 meters, May 5, 1951 (*Issiki-Ito*).

From other generally similar polished black species, including *Molophilus* (*Molophilus*) *nocticolor* sp. nov., and *M. (M.) takaoensis* Alexander, the present fly is well-distinguished by the long antennæ, pattern of the head, legs and wings and especially by the structure of the male hypopygium.

132. *MOLOPHILUS (MOLOPHILUS) IYOANUS* sp. nov.

Plate 4, fig. 28.

Belongs to the *gracilis* group and subgroup; general coloration brown; antennæ short; legs dark brown; wings narrow, weakly tinged with brown; male hypopygium with the dorsal lobe of basistyle produced into an acute spine; mesal lobe large, without major setæ; ventral lobe a stout setiferous club; both dististyle small, pale, the outer triangular, narrowed to the terminal spine; inner style produced into a curved spine.

*Male*.—Length, about 2.8 to 3 millimeters; wing, 3.7 to 3.8; antenna, about 0.75.

Rostrum and palpi black brown. Antennæ short, dark brown; flagellar segments oval, much shorter than the long coarse verticillis. Head light brown medially, more yellowed adjoining the eyes.

Pronotum brownish yellow; pretergites light yellow. Mesonotal præscutum chestnut brown, the lateral borders a little paler, humeral region yellow; posterior sclerites of notum pale brown to yellowish brown. Pleura obscure brownish yellow, darker dorsally. Halteres infuscated, the stem more yellowed basally. Legs with the coxæ and trochanters obscure yellow, remainder of legs dark brown; fore tibia with a slightly enlarged and darker basal ring. Wings narrow with a weak brownish tinge, the prearcular and costal fields a trifle more yellowed; veins and macrotrichia brown. Venation:  $R_2$  variable, lying approximately opposite to slightly before or beyond the level

of r-m; petiole of cell  $M_3$  a little less than three times m-cu; vein 2nd A long and sinuous, ending before the level of posterior end of m-cu.

Abdominal tergites dark brown, sternites and hypopygium more yellowed. Male hypopygium (Plate 4, fig. 28) with the dorsal lobe, *db*, of the basistyle modified into an acute spinous point; mesal lobe large and flattened, without modified setæ; ventral lobe, *vb*, a short stout club, with conspicuous setæ. Both dististyles, *d*, small, placed far distad; outer style a pale elongate-triangular structure, its tip acute; inner style longer, the apex long, curved to an acute point. Phallosomic plate, *p*, oval, glabrous. Ædeagus long and slender, a trifle dilated just before the apex.

*Habitat*.—Japan (Shikoku).

Holotype, male, Okadamura, Iyo, October 2, 1949 (Yano). Paratopotype, male.

*Molophilus* (*Molophilus*) *iyonanus* is quite distinct from all other regional members of the group, being most similar to species such as *M. (M.) pegasus* Alexander, differing conspicuously in the structure of the male hypopygium.

133. *MOLOPHILUS* (*MOLOPHILUS*) *NESIOTICUS* sp. nov.

Plate 4, fig. 29.

Belongs to the *gracilis* group and subgroup; general coloration dark plumbeous gray; posterior border of scutellum brownish yellow; antennæ (male) short; halteres yellow; wings weakly tinged with brown, the prearcular and costal fields more yellowed; abdomen dark brown, the hypopygium more brownish yellow; male hypopygium with the mesal lobe of basistyle narrowed into a black spine, the ventral lobe strongly clavate; outer dististyle a sinuous rod, the slightly expanded outer half with abundant erect setæ; both dististyles terminating in a long slender spine.

*Male*.—Length, about 4 millimeters; wing, 4.5; antenna, about 0.9.

Rostrum and palpi dark brown. Antennæ (male) relatively short, as shown by the measurements, dark brown; flagellar segments passing through oval to subcylindrical, with very long verticils. Head medium gray, with abundant yellow setæ.

Thoracic dorsum chiefly dark plumbeous gray, the pretergites restrictedly yellow; humeral region of the præscutum obscure yellow; posterior border of scutellum broadly obscure brownish yellow. Pleura brownish black. Halteres yellow, the base of stem somewhat clearer. Legs with the fore coxæ infuscated, the remaining coxæ yellow; trochanters yellow; remainder of

legs brown, the femoral bases broadly paler; tarsi darker brown. Wings with a weak brownish tinge, the prearcular and costal fields more yellowed; veins very pale brown, the macrotrichia darker. Venation:  $R_2$  lying shortly beyond the level of r-m; petiole of cell  $M_3$  nearly three times m-cu; vein 2nd A sinuous, ending just beyond m-cu.

Abdomen dark brown, the hypopygium more brownish yellow. Male hypopygium (Plate 4, fig. 29) with the dorsal lobe, *db*, of basistyle small; mesal lobe, *mb*, appearing as a flattened blade that narrows at apex into a slender straight black spine; ventral lobe, *vb*, strongly clavate, the outer half with a concentration of strong black setæ. Outer dististyle, *d*, a sinuous rod, the stem slender, glabrous, the outer half more expanded, with abundant erect setæ, the apex narrowed into a slender spine; inner dististyle a little longer, the outer half expanded, narrowed into a long slender spine.

*Habitat*.—Japan (Shikoku).

Holotype, male, Mount Tsurugi, Awa, Otiai, June 5, 1950 (*Issiki-Ito*).

The present fly is entirely distinct from the most similar regional species, including *Molophilus* (*Molophilus*) *efferox* Alexander, *M. (M.) ferox* Alexander, and *M. (M.) polycanthus* Alexander. It differs particularly in the structure of the male hypopygium, including the basistyle and both dististyles.

134. *MOLOPHILUS* (*MOLOPHILUS*) *NOCTICOLOR* sp. nov.

Plate 4, fig. 30.

Belongs to the *gracilis* group and subgroup; general coloration polished black; antennæ short, black; legs black; halteres white; wings strongly tinged with brown, the base yellowed; male hypopygium with the basistyle terminating in three lobes, the mesal one very large, with conspicuous setæ; outer dististyle bearing a strong spine near apex; inner dististyle a sinuous blackened rod with scattered spinulæ on outer half; phallosomic structure very broad, with low lateral shoulders, the surface with setulæ.

*Male*.—Length, about 4 to 4.2 millimeters; wing 4.5 to 4.8; antenna, about 1 to 1.1.

*Female*.—Length, about 4.5 to 4.7 millimeters; wing, 4.5 to 5.

Rostrum and palpi black, the former polished. Antennæ black throughout, relatively short; flagellar segments subcylindrical, subequal to or a little shorter than the verticils. Head polished black.

Thoracic notum polished black, the pleura duller. Halteres with stem dirty white, the knob clear white. Legs dark brown

to brownish black, the femoral bases in cases a little paler. Wings strongly tinged with brown, the centers of the cells of posterior half somewhat clearer, prearcular field yellowed; veins stout, brown, darker than the ground. Venation:  $R_2$  in transverse alignment with r-m or virtually so; petiole of cell  $M_3$  more than three times m-cu; vein 2nd A ending about opposite one-fourth the length of the petiole of cell  $M_3$ .

Abdomen, including hypopygium, brownish black. Male hypopygium (Plate 4, fig. 30) with the basistyle, *b*, terminating in three lobes, the dorsal one shortest, slender; mesal lobe, *mb*, very large and fleshy, with very conspicuous erect to subretorse setae; ventral lobe, *vb*, a long dusky glabrous blade, its apex obtuse. Outer dististyle, *d*, a powerful rod that bears a strong spine near apex. Inner dististyle longer, appearing as a sinuous blackened rod that narrows to an acute point, the base swollen, the outer half with scattered spinulae. Phallosomic structure, *p*, a very broad plate with low lateral shoulders, the surface with abundant setulae, those of the outer part longer and erect.

*Habitat*.—Japan (Shikoku).

Holotype, male, Totidani, near Yanase, altitude 350 meters, May 2, 1951 (*Issiki-Ito*). Allotype, female, Nisigawa, near Yanase, altitude 900 meters, May 3, 1951 (*Issiki-Ito*). Paratopotype, 1 male, pinned with type; paratypes, 1 male, 1 female, with the allotype.

Compared with other polished black species with whitened halteres, such as *Molophilus* (*Molophilus*) *daimio* sp. nov., this fly is told by the coloration of the head, legs and wings and especially by the very different male hypopygium.

135. *MOLOPHILUS* (*MOLOPHILUS*) *TAKACENSIS* Alexander.

*Molophilus takacensis* ALEXANDER, Philip. Jour. Sci. 51 (1933) 404–405, pl. 1, fig. 24 (venation), pl. 4, fig. 53 (♂ hypopygium).

TOSA: Kokusen near Yanase, altitude 500 meters, May 5, 1951 (*Issiki-Ito*).

Formerly known from Mount Takao, Honshu.

## ILLUSTRATIONS

[Legend: *a*, Aedeagus; *b*, basistyle; *c*, cercus; *d*, dististyle; *db*, dorsal lobe of basistyle; *dd*, dorsal dististyle; *g*, gonapophysis; *h*, hypovalva; *mb*, mesal lobe of basistyle; *p*, phallosome; *s*, sternite; *t*, tergite; *vb*, ventral lobe of basistyle; *vd*, ventral dististyle.]

### PLATE 1

- FIG. 1. *Tanyptera perangusta* sp. nov.; venation.  
 2. *Dolichopeza* (*Nesopeza*) *circulans* sp. nov.; venation.  
 3. *Nephrotoma electripennis* sp. nov.; venation.  
 4. *Dolichopeza* (*Nesopeza*) *circulans* sp. nov.; male hypopygium.  
 5. *Nephrotoma daisensis* Alexander; male hypopygium.  
 6. *Nephrotoma flavonota* (Alexander); male hypopygium.  
 7. *Tanyptera angustistyla* Alexander; male hypopygium.  
 8. *Tanyptera perangusta* sp. nov.; male hypopygium.

### PLATE 2

- FIG. 9. *Nephrotoma pullata* (Alexander); male hypopygium.  
 10. *Nephrotoma virgata* (Coquillett); male hypopygium.  
 11. *Nephrotoma esakii* Alexander; ovipositor.  
 12. *Tipula* (*Arctotipula*) *hirticula* sp. nov.; venation.  
 13. *Tipula* (*Arctotipula*) *hirticula* sp. nov.; male hypopygium.  
 14. *Tipula* (*Acutipula*) *gemma* sp. nov.; male hypopygium.  
 15. *Tipula* (*Acutipula*) *bulbifera* sp. nov.; male hypopygium.

### PLATE 3

- FIG. 16. *Limonia* (*Dicranomyia*) *nankaidensis* sp. nov.; venation.  
 17. *Limonia* (*Dicranomyia*) *nankaidensis* sp. nov.; male hypopygium.  
 18. *Limnophila* (*Dicranophragma*) *microspila* sp. nov.; venation.  
 19. *Limnophila* (*Dicranophragma*) *microspila* sp. nov.; male hypopygium.  
 20. *Hexatoma* (*Eriocera*) *cerberus* sp. nov.; venation.  
 21. *Hexatoma* (*Eriocera*) *imperator* sp. nov.; venation.  
 22. *Lipsothrix leucopeza* sp. nov.; venation.

### PLATE 4

- FIG. 23. *Erioptera* (*Hoplærioptera*) *shikokuensis* sp. nov., venation.  
 24. *Erioptera* (*Hoplærioptera*) *shikokuensis* sp. nov.; male hypopygium.  
 25. *Erioptera* (*Hoplærioptera*) *luctuosipes* sp. nov.; venation.  
 26. *Erioptera* (*Hoplærioptera*) *luctuosipes* sp. nov.; male hypopygium.  
 27. *Molophilus* (*Molophilus*) *daimio* sp. nov.; hypopygium.  
 28. *Molophilus* (*Molophilus*) *iyoanus* sp. nov.; hypopygium.  
 29. *Molophilus* (*Molophilus*) *nesioticus* sp. nov.; male hypopygium.  
 30. *Molophilus* (*Molophilus*) *nocticolor* sp. nov.; male hypopygium.